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| 13. ABSTRACT (Maximum 200 words) Qualification tests were performed to determine whether the in-service PA 157 Metal Container could be utilized to contain properly dunnaged solid type hazardous materials weighing up to a gross weight of 32 kg (71 pounds). The tests were conducted in accordance with Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods and the Department of Transportation's Title 49 CFR 107. The container has conformed to the POP performance requirements; i.e., the container successfully retained its contents throughout the specified tests. In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the PA 156 Metal Container as per the variation in Title 49 CFR 107, Sec. 178.601h. | | | | | |
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**PERFORMANCE ORIENTED PACKAGING TESTING
OF
PA 156 AND PA 157 METAL CONTAINERS
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

**Author:
Eric Wu
Mechanical Engineer**

**Performing Activity:
Naval Weapons Station Earle
Colts Neck, New Jersey 07722-5000**

December 1991

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INTRODUCTION

The PA 157 Metal Container tested, contained a simulated load of 23 kg (51 pounds) of sand representing the worst case of loading. Weight of the loaded container was 32 kg (71 pounds). This Performance Oriented Packaging (POP) test was performed to ascertain whether this standard container (Packing Group II) would meet the requirements as specified by the United Nations Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9 and Title 49 CFR 107 dated 1 October 1991. A base level vibration test was also conducted previously by WPNSTA Earle (Test Report 91011 of October 1991) for a period of 2 hours. Due to unavailability and the high cost of the containers, the number of containers used was less than the number required by the regulations. This has been approved by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the PA 156 Metal Container as per the variation in Title 49 CFR 107, Sec. 178.601h.

TESTS PERFORMED

1. Stacking Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.606. One container was used for this test. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a height of 3 meters (including the test sample). A weight of 136 kg (300 pounds) was stacked on the sample container. The test was performed for 24 hours. After the allowed time, the weight was removed and the container examined.

2. Drop Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.603. One container was used throughout the test. Five drops were performed from a height of 1.2 meters (4 feet), impacting the following surfaces:

- a. Flat bottom
- b. Flat top
- c. Flat on long side
- d. Flat on short side
- e. One corner

All tests were performed at an ambient temperature of $+70 \pm 20$ °F.

PASS/FAIL

1. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR 107, Sec. 178.606(d): "No test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages.

2. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR 107, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested--

(1) For removable head drums for solids, the entire contents are retained by an inner packaging (e.g., a plastic bag) even if the closure on the top head of the drum is no longer sift-proof;

(2) For a composite or combination packaging, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging;

(3) For a drum, jerrican or bag, any discharge from a closure is slight and ceases immediately after impact with no further leakage;

(4) For packagings for explosives, no rupture of the packaging occurs.

TEST RESULTS

1. Stacking Test

Satisfactory.

2. Drop Test

Satisfactory.

DISCUSSION

1. Stacking Test

The container was visibly checked after the 24-hour period was over. There was no leakage, distortion, or deterioration to the container as a result of this test.

2. Drop Test

After each drop, the container was inspected for any damage which would be a cause for rejection. Final inspection indicated damage was minimal with only minor denting noted. The container remained intact and functional upon completion of the tests.

REFERENCE MATERIAL

A. United Nation's "Recommendation on the Transportation of Dangerous Goods," ST/SG/AC.10/1, Revision 6

B. Title 49 CFR 107, et al., Performance Oriented Packaging Standard; Changes to Classification, Hazard Communication, Packaging and Handling Requirements Based on UN Standards and Agency Initiative.

C. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

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TEST DATA SHEET

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|--|---|
| DATA SHEET: | |
| Container: PA 157 Metal Container | |
| Type: 4A2 | Container P/N or NSN: |
| Specification Number: | Material: Steel |
| Gross Weight: 32 kg (71 pounds) | Dimensions: 29" H x 14-1/4" L x 5" W |
| Closure (Method/Type): Removable head with two latches | Tare Weight: 9 kg (20 pounds) |
| Additional Description: | |
| PRODUCT: | |
| Name: See table | NSN(s): See table |
| United Nations Number: See table | |
| United Nations Packing Group: II | |
| Physical State (Solid, Liquid, or Gas): Solid | |
| Vapor Pressure (Liquids Only): N/A At 50 °C: N/A At 55 °C: N/A | |
| Consistency/Viscosity: N/A | Density/Specific Gravity: N/A |
| Amount Per Container: 3 | Flash Point: N/A |
| Net Weight: See table | |
| TEST PRODUCT: | |
| Name: Sand | Physical State: |
| Consistency: N/A | |
| Density/Specific Gravity: N/A | |
| Test Pressure (Liquids Only): N/A | |
| Amount Per Container: N/A | Net Weight: 23.1 kg (51 pounds) |

TABLE 1
PA 156 and PA 157 Metal Containers

| DODIC | NSN | Type | Packing Drawing | UN Code | UN Number | #/ Cntr | Weight (lb) |
|-------|------------------|--|-----------------|---------|-----------|------------|-------------|
| C868 | 1315-01-285-6416 | Ctg, 81 mm, HE: M984, w/Fuze, MD, M734 | 12944509 | | | PA 156 | 50 |
| C869 | 1315-01-286-1385 | Ctg, 81 mm, HE: M983, w/Fuze, PD, M935 | 12944509 | | | PA 156 | 50 |
| C875 | 1315-01-200-4223 | Ctg, 81 mm, Practice: M879, w/Fuze, Prac, M751 | 12944509 | | | PA 156 | 51 |
| C870 | 1315-01-199-8688 | Ctg, 81 mm, Smoke, M819: w/Fuze MTSQ, M772 | 12944509 | | | PA 157 | 58 |
| C871 | 1315-01-199-8689 | Ctg, 81 mm, Illum, M853A1, w/Fuze, MTSQ, M772 | 12944509 | | | PA 157 | 53 |

**PA 156 AND PA 157
METAL CONTAINER
POP MARKING**

UN 4A2/Y32/S//USA/DOD/NAD**

**** YEAR LAST PACKED OR MANUFACTURED**